

Promoting Convergence in Biomedical and Biomaterials Sciences and Silk Proteins for Biomedical and Biomaterials Applications: An Introduction to Materials in Medicine and Bioengineering Perspectives

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Editor's Note

Human civilization has been nurtured by the positive application of human intelligence. Development in the biological approaches for its robust application window has merged it with engineering skills, which has been influenced in the creation of 'Bioengineering and Biomedical Science'. The aim of the new-borne branch is to promote the scientific discovery and innovation for the well-being of human kind through rigorous research and education. The focus of the study covers a wide range of therapeutics like: Cancer therapy, cardiac damage therapy and diagnosis of various other diseases. The Journal of Bioengineering & Biomedical Science, Volume 6, Issue 3, accumulated relevant data on Alzheimer's disease and discussed for the development of preventive programs of the disease. Moreover, the present issue presented a rational discussion on the development of nano-Hydroxyapatite, provided information about-dielectrophoretic separation method, automatic wheezing detection systems and the wireless communication device to record lung sounds.

Brain cell (neurons) death occurs in Alzheimer's Disease (AD), which results into the shrinking of total brain as tissue has progressively fewer nerve cells and connections in case of AD. Collection of proper data and access to sufficient information is the basic tool for the detailed description of the healthcare process, diagnosis, interventions, outcomes, evaluation and documentation. Establishment of a minimum data set is first step toward data standardisation in order to facilitate, share, and compare it with different centres. Ajami et al. [1], has showed in a pilot survey by making use of key words such as 'minimum data set', 'treatment', 'advantages', 'prevention', 'Alzheimer' and 'registry' in journal articles, conference abstracts, books, and other online documents with the help of Google search engine. In this survey the author gone through 70 articles and selected 50 articles for data collection. The data collection and analysis of this data helps for the development of preventive programs.

Hydroxyapatite is a Calcium Phosphate; it is similar to hard tissue of human in morphology and composition. Hydroxyapatite either mineral or synthetic is the major substitute of bone. Thermodynamically it is more stable Calcium Phosphate compound. Advancement in nanotechnology resulted in the production of nano Hydroxyapatite, which is attracting interest as a biomaterial for use in prosthetic applications. The addition of Titania, improves the mechanical properties of Hydroxyapatite. Ledesma [2], analysed the effect of Anatase in synthetic Hydroxyapatite obtained by co-precipitators through experimental evidence. This experimental results recorded, mechanical property surpass other, maximum hardness was

observed before immersing it, in simulated body fluid with 7%, that is due to the presence of calcium Titanate. They finally, reported more elasticity with nanometer HAcc but loses hardness (86%) when compared to micro-HA.

Di-electrophoretic separation is employed in several groups such as; chemical, engineering, biology for batch and continuous separation. Yunus et al. [3], provided significant information about angled microelectrode array as di-electrophoretic microfluidic device, for continuous mode of separation. This experiment proved that the separation of particles can achieve 100%, when the device pulsed at an intermediate frequency of 1 MHz and at Voltage of 10 V. Therefore, this experiment conducted has established an important understanding on how particle of size 1 μm and 2 μm present in a mixture react to the changes of applied electrical signal and frequency.

Many people all over the world suffer from different types of respiratory disorders. One among which is wheezes, a condition in which more musical respiratory sounds occur, when compared to the normal respiratory sound. This condition occurs due to pathological condition of the respiratory system with irregularities in pulmonary obstruction, in those who are suffering from chronic obstructive pulmonary disease and asthma. A limited work has been done for the real time detection of wheeze sound. Gadge et al. [4] documented about automatic wheeze detection systems with spectral power estimation in real time. The algorithm of this device is developed with high sensitivity that helps the doctors to validate by listening to each individual RS segment. Finally, they concluded that, detection of wheeze sound by applying automatic wheeze detection system is proved to be beneficial, reliable, fast and accurate, which is essential for automatic diagnosis and treatment of respiratory disorders.

Cardiovascular disease is one among the leading cause of deaths in the United States. Various parameters can provide useful insight into health of cardiovascular system such as, Pulse Transit Time (PTT), Heart Rate Variability (HRV) and QRS duration, but no information is available on the effects of orthostatic stress. Zaidi and Collins [5] provided the information about the changes associated with orthostatic stress in HRV, PTT and QRS duration. The data collected reported that, orthostatic stress affected the parameters in both supine and upright positions. Even gender and subject height also played a distinguishing role. Tall subjects recorded higher values for R-R interval and PTT parameters, whereas, male subjected reported higher values of all three parameters. The results of this article will provide better understanding of the interactions between various parameters and their reflection on hemodynamic changes caused by orthostatic stress.

It is very convenient for doctors to record heart and lungs sounds, which make auscultation at certain stage. Lu [6] provided significant information about the wireless communication device to record lung sounds. This device contains unidirectional microphone, wireless body packed with transmitter and a wireless receiver. The sound recorded is transmitted to a mixing console for amplification. This device proved to reduce complex devices and algorithms, and also reduce the noise, offers a high Signal-to-Noise Ratio (SNR) and facilitates device use in different environment. Finally, they concluded that this instrument can be used to record lung sounds in very convenient way because of its excellent low-frequency response.

Mycobacterium tuberculosis H37Rv has 3,924 protein coding genes, out of which 606 proteins are classified as unknown proteins. Badapanda et al. [7], tried to predict the reliable functional annotation of these proteins by employing different bioinformatics annotation tools.

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